2017

Aricept

Colleen M. Westburg
Parkland College

ARICEPT[1]

Donepezil Hydrochloride[1]

Labeled Uses[1]:

The labeled uses of Donepezil Hydrochloride are to treat the symptoms of mild, moderate, or severe dementia of Alzheimer's type.

Unlabeled Uses[1]:

The unlabeled uses of Donepezil Hydrochloride are to treat the symptoms of vascular dementia, poststroke aphasia, and memory improvement in multiple sclerosis patients.

Literature Value of Water Solubility[3]:

2.931 mg/L

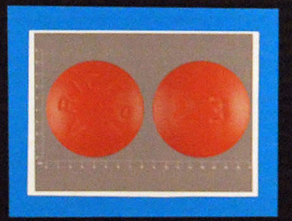
Water Solubility g/100 mL[4,5,7]:

2.931 mg/L (1 g/1000mg)(1 L/1000mL)(100/100)= 2.931 x 10^{-3} g/100mL

Water Solubility:

Insoluble

Pill Images[5]:



Chemical Formula[1]:

$C_{24}H_{29}NO_3 \bullet HCl$

Literature Value of Molar Mass[3]:

415.96 g of $C_{24}H_{29}NO_3 \bullet HCl$

Molar Mass[4,5,7]:

12.01 g of Carbon x 24 g of Carbon from the Donepezil formula= 288.24 g Carbon

1.01 g of Hydrogen x 30 g of Hydrogen from the Donepezil formula= 30.3 g Hydrogen

14.01 g of Nitrogen x 1 g of Nitrogen from the Donepezil formula= 14.01 g of Nitrogen

16.00 g of Oxygen x 3 g of Oxygen from the Donepezil formula= 48.00 g of Oxygen

35.45 g of Chlorine x 1 g of Chlorine from the Donepezil formula= 35.45 g of Chlorine

288.24 g Carbon + 30.3 g Hydrogen + 14.01 g of Nitrogen + 48.00 g of Oxygen + 35.45 g of Chlorine= 416 g of $C_{24}H_{29}NO_3 \bullet HCl$

416 g of $C_{24}H_{29}NO_3 \bullet HCl$

How does the body take in Aricept?[1]

Donepezil Hydrochloride is absorbed rapidly through the GI tract. The GI tract is the passageway that food passes through when you eat something.

What the body does with the drug after it is absorbed?[1]

Donepezil hydrochloride raises the amount of acetylcholine in the cerebral cortex by slowing the deteriorating acetylcholine. Acetylcholine is a chemical in the brain that helps make memories.

How does the body break down the drug?[1]

Donepezil hydrochloride is metabolized in the liver by CYP2D6 and CYP3A4. CYP2D6 and CYP3A4 are enzymes in the liver that help break down medication.

How does the body eliminate the drug?[1]

Donepezil hydrochloride is primarily eliminated through urination.

Classification[1]:

Central acting cholinergic; cholinesterase inhibitor

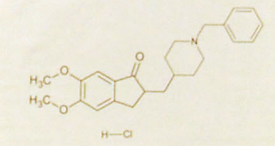
Functional Groups[2,6,7,8]:

-Amines(Tertiary): hydrophilic, less basic than the other amines
-Aromatic: hydrophobic, neutral
-Cyclo: hydrophobic, neutral
-Ether: hydrophilic, neutral
-Ketones: hydrophilic, neutral

Chemical Names[2]:

2,3-Dihydro-5,6-dimethoxy-2-[[1-(phenylmethyl)-4-piperidinyl]methyl]-1H-inden-1-one ● HCl;5,6-dimethoxy-2-[[1-(phenylmethyl)-4-piperidinyl]methyl] -2,3-dihydro-1H-inden-1-one ● HCl;1-benzyl-4-[(5,6-dimethoxy-1-indanon-2-yl)methyl]piperdine ● HCl.

Condensed Structural Formula[2,8]:



Dosing[1]:

5 mg

Supplied[1]:

Aricept/Donepezil/Donepezil Hydrochloride Oral Tab Orally Dis: 5 mg, 10 mg

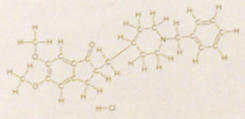
Aricept/Donepezil/Donepezil Hydrochloride Oral Tab: 5 mg, 10 mg, 23 mg

Tablets[4,7]:

5 mg of Donepezil HCl x 1 tablet of Donepezil HCl = 5 tablets a day of Donepezil HCl
1 Day 1 mg of Donepezil HCl

Model of Aricept[1]:

Expanded Structural Formula[2]:



1. Wilson, B. A., Shannon, M. T., & Shields, K. M. (2017). *Aricept. Pearson Nurse's Drug Guide 2017* (pp.510-520). Hoboken, NJ: Pearson Education, Inc.

2. (2015). Donepezil. In O'Neil, M. J., Heckelman, P. E., Dobbelaar, P. H., & Roman, K. J. (Eds.) *The Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals* (p. 625). Cambridge, UK: Royal Society of Chemistry.

3. Genome Alberta, Genome Canada, GenomeQuest Inc., and the Departments of Computing Sciences & Biological Sciences at the University of Alberta specifically the Dr. David Wishart Research Group. (2017, September 1). Donepezil. *Drugbank*. Retrieved from https://www.drugbank.ca/drugs/DB00843

4. Physicians' Desk Reference. (2017). Drug summary Donepezil Hydrochloride. *PDR.net*. Retrieved from http://www.pdr.net/drug-summary/Aricept-donepezil-hydrochloride-138.4082

5. United States National Library of Medicine National Institutes of Health. (2013, December 5). *PIL images of Donepezil Hydrochloride*. *Pillbox*. Retrieved from https://pillbox.nlm.nih.gov/assets/largeJPEG/65245.jpg

6. Timberlake, K. C. (2018). *Chemistry: An Introduction to General, Organic, and Biological Chemistry, 13th ed.* Upper Saddle River, NJ: Pearson Education, Inc.

7. (2017). In Drake, S. A. (Ed.) *Chemistry 106 Classroom Supplement Fall 2017 Revision*. Champaign, IL: Stipes Publishing L. L.C.

8. Advanced Chemistry Development, Inc. (2015). ACD/ChemSketch Freeware [Computer Software]. Retrieved from http://www.acdlabs.com/resources/freeware/chemsketch

Colleen Westburg
Chemistry 106-003
Parkland College